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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WARREN, MATTHEW E

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 07/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/476,961

Applicant(s)

YU, BIN

Examiner

Matthew E. Warren

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19, 20, 26 and 27 is/are allowed.
- 6) ☒ Claim(s) 18, 21-25, and 28-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the Amendment filed on May 5, 2003.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 18, 21-25, and 28-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadosh et al. (US 5,677,224) in view of Miller (US 5,625,216).

Kadosh et al shows (fig. 1U) a semiconductor device including a plurality of field effect transistors, each transistor comprising a gate (130) over a channel and a deep source (206) and drain (198) region doped with dopants of a first conductivity type (P). Source (204) and drain (152) extension regions are integral with the deep source and drain regions respectively. The source extension is more heavily doped (P+) than the drain extension (P-). Kadosh discloses that the source extension is deeper than the drain extension such that the device has a low source-drain series resistance and reduced hot carrier effects but does not disclose the drain extension being deeper than the source extension. Miller shows (fig. 6) a semiconductor device having a deep drain region (27) and a source region 29). The device includes source extension (underdiffusion region U_s) and a drain extension (underdiffusion region U_d) integral with the source and deep drain regions respectively. The drain extension is more than 80nm

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deep (col. 3, lines 15-19). The deeper drain extension provides an increased gate-drain capacitance (col. 3, lines 57-62) or vice versa (col. 4, lines 39-42). With respect to the limitations of the claims concerning the concentration of the dopants, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the dopants at a specific depth and concentration, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the asymmetrical source/drain configuration of Kadosh by forming a drain extension deeper than a source extension as taught by Miller to increase the gate-drain capacitance.

With respect to the limitations concerning the formation of the device in claims 21-35, a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, **190 USPQ 15 at 17**(footnote 3). See also in re Brown, **173 USPQ 685**; In re Luck, **177 USPQ 523**; In re Fessmann, **180 USPQ 324**; In re Avery, **186 USPQ 116** in re Wertheim, **191 USPQ 90** (**209 USPQ 254** does not deal with this issue); and In re Marosi et al, **218 USPQ 289** final product per se which must be determined in a "product by, all of" claim, and not the patentability of the process, and that an old or obvious product, whether claimed in "product by process" claims or not. Note that Applicant has the burden of proof in such cases, as the above case law makes clear. "Even though product-by- process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The

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patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process.” In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985)(citations omitted).

Allowable Subject Matter

Claims 19 and 20 are allowed.

Claims 26, and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed with respect to claims 18, 21-25, and 28-37 have been fully considered but they are not persuasive. The applicant primarily asserts that the combined references do not show all of elements of the claims, specifically that Miller does not cure the deficiencies of Kadosh and that Kadosh teaches away from the drain extension being deeper than the source extension. The examiner believes that the combined references teach all limitations of the claims. As stated in the rejection, Miller was cited to show that a drain extension is deeper than a source extension. The applicant completely disregarded the examiner's interpretation that the portion of the source and drain under the gate of Miller (the portions labeled U_s and U_d) which are

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labeled by Miller as underdiffusion regions, function as source and drain extensions. With that interpretation, the drain extension/underdiffusion portion is deeper than the source extension/underdiffusion portion. As seen in the drawings of the instant invention, the source and drain extension regions are formed directly under the sidewall insulators and outer portions of the gate electrode in the same manner as the underdiffusion portions of Miller. Miller does not use the term "extensions" but because such underdiffusions are of the same structure and material as the extensions of the instant invention, then such underdiffusions function as extensions. Furthermore, the gate length and asymmetrical underdiffusions of Miller improve the breakdown voltage characteristics of the silicon (col. 3, lines 57-67). Thus the invention of Miller limits the effects of the short channel. Miller also discloses that the asymmetrical configuration can be applied in reverse so that the source extension/underdiffusion is deeper than the drain underdiffusion (col. 4, lines 35-45). Thus, the invention is also directly applicable to Kadosh, who only discloses the deeper source extension. Just because Kadosh does not disclose deeper drain extension does not specifically mean that Kadosh teaches away from the deeper drain extension. Kadosh merely neglects to disclose that limitation, and "neglecting to disclose" does not mean "teaching away." Kadosh would only teach away from the limitation if it was stated that it was not desirable to form a deeper drain extension. No statement teaching away from the deeper drain could be found in Kadosh. Therefore the references, which can combined, show all of the elements of the claims. This action is also made final.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (703) 305-0760. The examiner can normally be reached on Mon-Thurs, and alternating Fri, 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

MEW

MEW
July 24, 2003



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800